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Multi-level forces and differential effects affecting birth cohorts that stimulate mobility change*

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ABSTRACT

This paper presents a dynamic model at three levels to understand changing mobility trends at the population level. A multi-level framework is proposed that enables existing research and analysis to be considered in a more holistic sense. This framework assists in identifying predictions and transition pathways for different birth cohorts, particularly as they reach older age. This has the aim of bringing about a greater understanding of the socio-demographic influence on mobility trends, with a focus on the cultural transitions that affect birth cohorts differently in terms of their travel behaviour. The framework presented here captures the multi-level forces and structural effects that impact mobility. The paper examines how these forces and effects interact at different levels to influence the changing mobility of birth cohorts at different points in time. Examining the simultaneous operation of these levels is of conceptual importance to assist in the interpretation of mobility trends, as well as understanding future mobility implications, of future generations.

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Introduction

Explanations of mobility change in transport studies are predominantly economic based. Dominant frameworks also, in general, tend to consider single socio-economic explanations. Differences in mobility amongst the population are frequently considered in terms of structural factors that commonly include age, income, location and gender. Current approaches towards examining mobility trends tend to consider the behaviour of population groups at single points in time, which is then repeated. For example, when considering the mobility of older people, the 65 years and over age group may be examined at 1995, 2000, 2005, etc. without considering wider socio-demographic composition of the age group which changes between different time points.

Mackett (2002) highlights the wider impact on transport planning in the U.K., as models are primarily based on commuting trips, with only 16% of trips in the U.K. for commuting (Department for Transport [DfT], 2015). As a result, there is a focus on individual trips, rather than contextualising travel decisions by lifestyles. As travel has become more

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complex, neither the models nor the data sources reflect this, which leads to simplistic transport policies (Mackett, 2002).

Analysis of mobility trends need not be limited only to the empirical level driven by individual decisions, but may also be shaped by deeper levels of meaning associated with social, cultural and economic structures. Furthermore, these deeper structures will themselves change over time, producing significant shifts in mobility behaviour as meanings are re-negotiated as well as being altered over time.

The framework presented in this paper adopts a dynamic multi-level approach that considers a combination of structural and cultural factors operating simultaneously to influence mobility outcomes. Fielding (1993, 2010) used a similar framework to schematise the economic processes in relation to migration. In this paper, the framework has been adapted to outline the multi-level forces involved in stimulating changes in mobility and consists of three different layers. These layers represent different processes that occur at varying structural levels and also operate over varying temporal scales. An examination of the simultaneous operation of these levels will assist in understanding future mobility outcomes.

The rest of the paper is structured as follows. The next section provides an overview of recent declining mobility trends and current explanations, with particular emphasis on birth cohorts. The proposed framework is introduced in the following section which includes presenting an outline of the period effects and varying levels of structural effects involved in mobility change. After an examination of these effects, the paper will consider an example of how these different factors have shaped current mobility trends for the so-called Baby Boomer cohort, considered here as born (1945–1964). The paper will conclude by presenting the implications for future research, in particular for studies considering “Generation Y” or “Millennials”, commonly defined as being born from around the 1980s onwards.

Recent trends of declining mobility

Although there has been an upward trend in mobility over the past three decades as incomes have risen and car ownership has increased, particularly amongst the poorest fifth of British households over the past decade, more recently there has been a reduction in the rate of growth in travel that began in the mid-1990s (Independent Transport Commission, 2010). Recently, studies have revealed that mobility has been declining in advanced economies including Germany, Australia, France, the U.K., the U.S.A. and Japan, over the past decade, leading to some commentators highlighting the emergence of “peak car”, whereby total car travel per capita has shown very low growth and even declined in some countries (Goodwin, 2012b; Metz, 2010). As this decline is occurring across different countries, there are some common features as possible explanations. To date many of the explanations around this declining mobility have been attributed to economic factors, such as changes in fuel prices, income, GDP and unemployment, particularly by governments (Goodwin, 2012a; Grimal, Collet, & Madre, 2013). As the trend occurred prior to the most recent economic recession in 2008, it is considered to be a real structural effect rather than a temporary cyclical effect (Goodwin, 2012a). It should also be recognised that the nature of the influence of economic factors on mobility has

changed, with increasing attention being paid to lifestyle and attitudinal factors on mobility (Goodwin & Van Dender, 2013).

Demographic influences on “peak car” have been considered, with a particular focus on younger people. These include the reduction in the propensity to learn to drive and buy a car, in particular amongst younger men (DFT, 2010; Frändberg & Vilhelmson, 2011; Goodwin, 2012a; Kuhnimhof, Buehler, Wirtz, & Kalinowska, 2012; Noble, 2005a; Van Der Waard, Jorritsma, & Immers, 2013). Explanations for this include the increasing costs of motoring (DFT, 2010) and greater value placed on the use of purchasing new mobile technology (such as smartphones and tablets) and having internet access amongst younger people (Hopkins & Stephenson, 2014). Changing life stages and household living arrangements have also been found to have a great impact on the decline in youth driving licensing (Delbosc & Currie, 2013).

Other demographic forces changing travel car patterns have been highlighted, such as population growth and urbanisation, as well as an ageing population (Kuhnimhof, Zumkeller, & Chlond, 2013; Metz, 2013). Spatial distributions of demographic projections, particularly in urban areas, influencing “peak car” have also been considered (Goodwin & Van Dender, 2013; Headicar, 2013). Whilst the “peak car” phenomenon has been explained by a few common factors, there are other factors that contribute to changing mobility, particularly social and cultural factors on mobility that have been explored in studies on transport and society (Lyons, 2004), older people (Musselwhite & Haddad, 2010; Schwanen & Páez, 2010) and life-course changes (Goodwin, 1989; Scheiner, 2014; Scheiner & Holz-Rau, 2013).

In addition, understanding of mobility in transport studies is being augmented with the development of the “new mobilities paradigm” (Shaw & Hesse, 2010). The “new mobilities paradigm” has broadened the concept of mobility, incorporating the notion that mobility itself has become a significant activity rather than simply a means to travel from place to place (Pooley, 2009). The development of information communication technologies (ICT) has brought about opportunities for virtual mobility (Pooley, Turnbull, & Adams, 2005b). In the example of declining mobility, the growth in online activities, for example, social networking, online retail and mobile computing, is thought to explain a reduced need to travel (Goodwin, 2012a; Metz, 2010). However, the relationship between ICT and transport is complex, with evidence suggesting both substitution and stimulation of travel, as well as the enhancement of the travel experience (Lyons, 2009).

These studies and explorations into mobility highlight the need for the debates surrounding “peak car” to be more attentive to the changes of the economic and social contexts populations experience simultaneously. Ryder (1965) argued that cohort membership could be as important in determining behaviour as other social structural factors such as socio-economic group.

Birth cohort membership is likely to be an important consideration which has tended to be neglected in these explanations for declining mobility. This is particularly important to consider if the mobility decline is perceived as being a structural effect rather than a temporary, cyclical effect.

Currently missing from the “peak car” debate then is a consideration of the deeper-layered, multi-level combination of demographic forces and cultural underpinnings behind explanations for mobility and travel behaviour changes. Understanding the combination of different structural forces allows for reflection of the different socio-

economic contexts that could assist in interpreting findings. By exploring the simultaneous interactions between different levels of socio-demographic factors, an explanation of the settings in which cohorts grow up can be added to the debate. Through establishing a framework, past and existing conditions that have influenced and are influencing the mobility of current cohorts can be identified to assist in the interpretation of results as well as contribute to predictions regarding future mobility outcomes.

Cohort groups and mobility

Broadening the socio-demographic and cultural perspective particularly in relation to cohorts is crucial when investigating changing mobility, given the different views, values and expectations between cohort groups that have developed as each birth cohort has grown up in different social, economic and historical environments (Ryder, 1965). Men and women in each birth cohort face a unique set of opportunities and constraints at different points over their life-course. As people age through the life-course, mobility changes due to different activities and circumstances associated with different life-course stages (Oppermann, 1995; Pooley, Turnbull, & Adams, 2005a; Ryley, 2006). Understanding the wider influences on these birth cohorts will assist in generating clues for future mobility.

In recent years, studies have begun to take into greater consideration the differences between birth cohorts and changing mobility trends (Frändberg & Vilhelmson, 2011; Scheiner & Holz-Rau, 2013; Thakuriah, Menchu, & Tang, 2010), particularly concerning the mobility of older people (Hakamies-Blomqvist & Henriksson, 1999; Hjorthol, Levin, & Sirén, 2010; Newbold, Scott, Spinney, Kanaroglou, & Páez, 2005).

By focusing on age groups, certain assumptions about different groups have been made. Travel behaviour of older groups has derived from the behaviours of pre-boomer cohorts.

In addition, historically the 20–29 age group was highly mobile (Pooley et al., 2005b); however, more recently Frändberg and Vilhelmson (2011) have found that mobility amongst younger age groups has declined in Sweden. There are also shifts occurring in relation to the gender mobility gap; studies have found that gender differences in mobility have been converging at the aggregate level, particularly amongst older people (Frändberg & Vilhelmson, 2011; McQuaid & Chen, 2012; Noble, 2005b; Rosenbloom, 2006). Tilley and Houston (2016) find that women of the “Generation Y cohort” (b.1976–1985) had higher levels of mobility compared to their male counterparts. This particular finding has not been observed previously, indicating that aggregate mobility trends change in line with each successive cohort. Therefore, cohort effects are useful in explaining mobility trends. With each successive cohort there is likely to be greater variation in their mobility in line with wider socio-demographic and other structural factors. Cohort effects are those attributable to differences in historical, social, economic, cultural and technological contexts, in which different cohorts have grown up (Rafferty & King-Hele, 2010); in essence, these characterise cohort groups. Cohort effects are explained by illustrating the influential contextual factors in the model presented within this paper.

Multi-level perspectives

Recognising the significance of the contributions of wider social theory in mobility studies (Bailey, 2005), studying travel behaviour involves more than simply observing the empirical processes captured in cross-sectional spatial datasets (in Gregory's [1978] terms, mobility as part of the spatial patterns of social exchange). There is greater value in seeking explanations that are shaped by spatial structures and schema over space–time.

Fielding (2012), for example, has taken this argument about the significance of different levels of socio-spatial structures and applied it to wider mobility research in relation to his search to explain temporal trends in internal migration in the U.K. between 1950 and 2010.

Fielding (2010) used this framework to schematise the economic processes in relation to mass migration, that is, large net streams crossing national borders resulting in significant population redistribution. With the framework, Fielding demonstrates that there are deeper structural explanations to the global economic crisis rather than it being a cyclical downturn (King, 2012). In relation to the “peak car” phenomena, as the decline in mobility occurs after the recession, this is considered to be a real structural rather than a temporary cyclical effect (Goodwin, 2012a). Therefore, drawing on Fielding's work helps to illustrate the structural explanations behind “peak car” and consider how mobility is influenced at these deeper levels.

Whitmarsh (2012) also argues that the multi-level perspective (MLP) framework is a useful analytical framework for understanding transitions, as it highlights dynamics and complexity of both incremental and radical innovation and is an approach that moves beyond economic focused models. Geels (2012) uses this framework to explain transport transitions, noting that it recognises there are no single “causes” or drivers in transitions; rather there are processes on multiple dimensions and at different levels. However, there are ways in which this can be improved. As Whitmarsh (2012) highlights, the applications of MLP in transport are limited in understanding societal systems as they can be treated as exogenous, with lifestyles (Shove & Walker, 2007) and culture (Haxeltine et al., 2008) also considered in this way.

In the MLP framework, Geels (2012) describes the socio-technical landscape, which is in broader terms, as it includes a variety of different things, such as urban layouts, societal values and beliefs and macroeconomic trends; therefore, the macro-level is less clearly conceptualised (Whitmarsh, 2012). The framework by Fielding (2010) is useful to adapt as it provides a broader overview of the socio-economic context, and thus begins to unpack this “landscape”.

Changing mobility of cohort groups

This paper introduces a conceptual model to explore the relationship between birth cohorts and mobility, over time and through space. The proposed framework enables existing research and analysis into changing travel trends, such as those related to “peak car”, to be used in a more holistic sense.

Empirical analysis using data from the U.K. National Travel Survey from 1995 to 2008 in Tilley and Houston (2016) reveals that birth cohorts have changed their travel behaviour over time, not all as a result of age effects. By adopting a cohort approach, older people

were found to travel further than previous generations, whilst younger men were found to have much lower mobility than previous generations.

An examination of mobility by age group revealed that the mobility of those aged under 40 declined, with the most significant decline amongst younger men under 30, so that women of the same age now travel further. However, those aged 40 and over increased their weekly mobility. In particular, the weekly mobility of women aged 60–69 increased, as well as that of older men aged 70 and over.

Exploring the mobility of different cohort groups, when comparing men and women, older men belonging to the Boomer cohorts (b.1946–1965) had significantly higher weekly mobility compared to women, with the Boomer cohorts having the highest mobility of all cohort groups, with some of the oldest cohorts having a decline in mobility over time.

The mobility of women belonging to the younger birth cohorts in the study, Generations X (b.1966–1975) and Y cohort (b.1976–1985), had significantly increasing mobility over time. Indeed, Generation Y women had significantly higher weekly mobility in 2006–2008 compared to men of the same cohort. This finding has not been observed previously, indicating that mobility changes with each successive cohort.

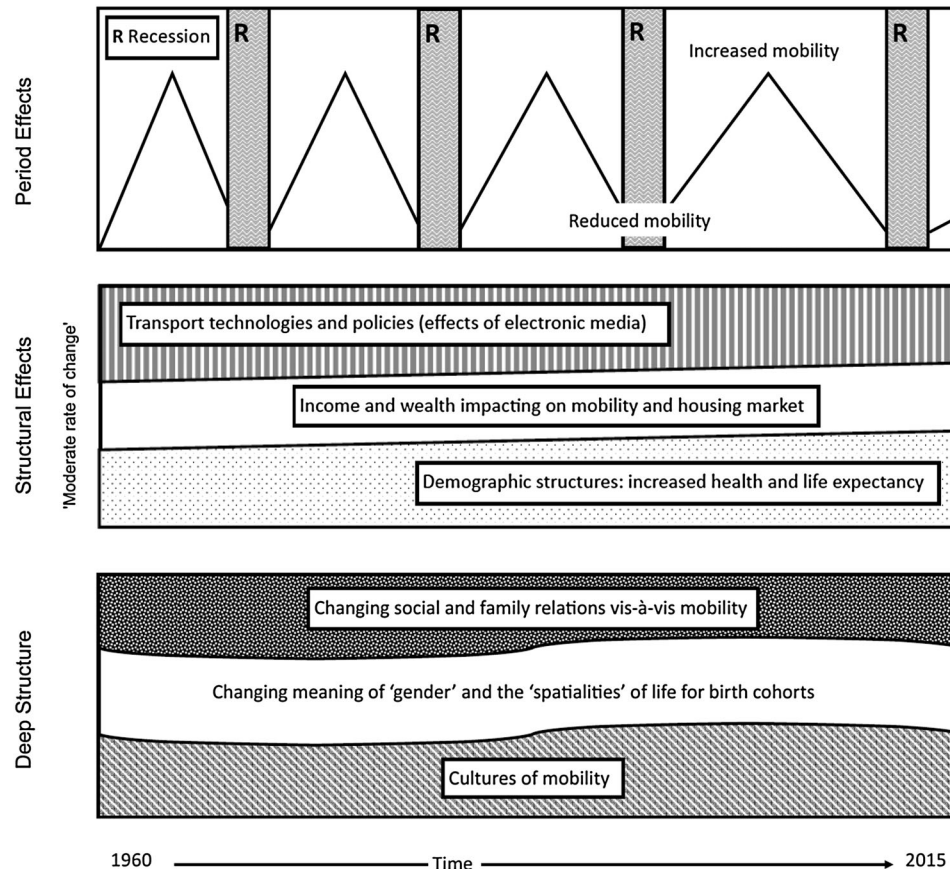
These findings indicate that cohort membership is important to understand mobility patterns. With each successive birth cohort ages, there is likely to be greater variation in mobility, given the different socio-economic contexts they experience. The framework proposed in this paper then adopts a longitudinal demographic lens to offer a more dynamic understanding of how mobility changes and trends might be understood at different socio-spatial scales of investigation.

The framework assists in unpacking the lifestyle changes of different birth cohorts, and could help with employing cohort analysis in transport studies. The framework is an assessment of different processes at work influencing mobility. Whilst a time span of over 55 years is provided, it can be used at different temporal scales, depending on the timescale of the investigation. The framework also coincides with the beginning of the U.K. National Travel Survey, a repeated cross-sectional household survey conducted by the U.K. government, which collects information on travel patterns, and was first conducted in 1965–1966. It ran periodically through the 1970s and 1980s and has been running continuously since 1988. The framework then is suitable for exploring investigations covering this long timescale. For example, recent decline in mobility has predominantly found to be explained by the fall in mobility of younger people. However, older people of the Boomer generation are becoming more mobile, yet assumptions about older people tend to be derived from pre-Boomer cohorts. There would appear to be different effects for cohort groups, which the framework can assist in identifying.

A dynamic framework for understanding the multi-level forces stimulating mobility change for birth cohorts

Figure 1, adapted from Fielding (1993, 2010), outlines the wider multi-level forces that may influence changes in mobility patterns over time. It identifies three different layers of effects, at varying levels, over the past 55 years that are contributing to changing mobility trends.

The processes occurring in each layer can be summarised as follows:



1. Economic growth and recession cycle affects size of Government budgets (cuts vs. spending influencing level of capital transport investment and subsidy provision for transport schemes and policies). There are also geographical variations in provision.
2. Other economic effects e.g. unemployment rates and rates of inflation, influence disposable incomes of individuals, affecting activities they partake in e.g. commuting therefore resulting mobility in different mobility levels over time. Economic growth usually associated with high mobility and vice versa.
3. Housing market affected leading to mobility as substitute for residential migration and vice versa.

1. Changing planning and transport policies leading to use of different modes due to dispersal of people and services away from CBD so transition from bike and public transport to car and ICT influencing meaning of travel e.g. working on public transport during travel to employment; travel for inherent pleasure rather than derived demand.
2. Income and wealth influencing home ownership and transport mode choice (value of travel time - cost vs. time). Longer term impact on the housing market and inequality.
3. Demographic trends; e.g. ageing population (healthier older people) leading to changing activity patterns influencing mobility.

1. Changing socio-demographic relations influencing mobility: dispersal of family support networks and rise of 'Sandwich Generation'.
2. a. Gender convergence in mobility (changing role of women); b. Changing residential locations amongst birth cohorts e.g. younger moving to university cities, older prefer rural/coast, future older cohorts preference towards urban.
3. a. Expectations about mobility: holidays; activities; visiting family and friends; b. Perceptions of transport modes due to policies and culture i. Thatcherite Govt 'failure if on a bus at 26' reinforcing car use; ii. London congestion charging & public transport investment; iii. Introduction of 'Boris bikes' and sustainable, healthy travel.

Adapted from Fielding (1993, 2010)

Figure 1. A dynamic schema of the multi-level forces stimulating mobility change.

- (1) Period effects (this encapsulated the top layer of macroeconomic processes, which tend to be short term in nature);
- (2) Mid-structural effects (this is the middle layer which summarises structural changes operating at a moderate rate of change) and
- (3) Deep structure effects (this is the bottom layer of cultural changes occurring at an almost imperceptible rate of change).

The simultaneous operation of these three layers has varied impacts on the mobility of birth cohorts as they age, which in turn influence mobility outcomes at the population level. Examining how these three layers interact with each other can assist in understanding how mobility changes over time.

It should be remembered that the framework attempts to encompass the complexity of interrelated contextual factors involved in changing mobility trends. The defining feature of the three levels is the temporal scale over which they operate. The layers have been ordered according to timescale, with the faster processes at the top of the model, with slower processes towards the bottom. Time is important here to illustrate the changing nature of contexts to be considered in line with mobility trends. Also important to note is that some levels may operate over different spatial scales.

Period effects: top layer of macroeconomic processes

The top layer of [Figure 1](#) highlights the macroeconomic processes of growth and recession since 1960. Periods of economic growth are a “self-reinforcing process” as productivity, for example, consumer sales, improves business confidence and investments, and increases demand for labour, thereby lowering unemployment. This cycle is eventually “broken”, resulting in opposite impacts ([Fielding, 1993](#)). Economic growth and recession can be considered as period effects, which are effects that impact the whole population (as opposed to cohort effects, which are specific to birth cohorts). However, period effects may impact cohorts differently.

Levels of economic activity impact on capital investment and subsidy provision for transport systems, as well as other associated services by government and the private sector. Since the 2008 recession, there have been programmes of austerity across many European countries. Reduction in government spending reduces public transport subsidies, leading to a contraction in services. Rising transport costs were also observed as fuel prices increased along with increases in public transport fares above the rate of inflation ([Bourn, 2013](#)).

Increases in public transport fares above the rate of inflation also mean that the relative costs of the car are lower in comparison, despite current recessionary strains on income ([Hopkinson, 2012](#)). More recently, fluctuating oil prices have led to changes in transport costs.

The labour market is also affected during economic growth and recession ([Fielding, 2010](#)). As a result, mobility can fluctuate. For example, unemployment levels affect commuting trips and disposable income is impacted by employment status, which in turn influences purchases of goods, services and activity participation and therefore mobility patterns.

There are spatial aspects to economic forces which impact on mobility. As residential location impacts on transport mode choice (Stanbridge, Lyons, & Farthing, 2004), pertinent to this discussion are housing market cycles as these influence the timing of residential migration choices, as well as location patterns (Fielding, 2010). In relation to the housing market cycle, there is recent evidence suggesting that residential migration is being substituted for increased mobility as the housing market has slowed since the 2008 recession (Cooke, 2011).

Economic growth and recession periods have been identified in the model as they have some immediate impacts but they may also lead to longer-term direct and indirect impacts on mobility, as well as potentially a delayed impact. It is important to understand when they occur to be able to decipher the immediate impact on mobility, as well as understand the time-lag effects. Whilst there can be quick impacts, there are also longer-term factors to consider, which are addressed in the following layer.

Structural effects: middle layer of structural changes

In addition to macroeconomic processes, there are structural forces affecting mobility, which are presented in the second layer of Figure 1. Pertinent forces to mobility have been highlighted, which have changed in nature over time at a moderate rate of change.

Post-war planning and resulting processes of suburbanisation and counter-urbanisation over time have encouraged residential homes and places of employment to be located on cheaper land on the suburban fringe, away from urban centres (Pooley et al., 2005b; Power, 2012). Goods, services and activities became increasingly dispersed in relation to residential location, forcing longer-distance travel and contributing to increased car use over time (Lucas, Grosvenor, & Simpson, 2001). New transport technology enabled people to travel faster over long distances, leading to the shrinking of space and undertaking of more activities (Pooley, Turnbull, & Adams, 2006). Knowles (2006) argues that there has been differential shrinking in time/space, which has been very uneven spatially, economically and socially. As a result, there are inequalities in terms of travel time, accessibility to goods, services and activities in relation to location as well as transport modes.

Developments in electronic media and telecommunications have influenced the location of activities and services. Rapid communication (electronic and physical transport) allows firms to coalesce in space and benefit more from economies of scale – with telecommunications allowing interactions to be maintained further afield, without actually being there (Leamer & Storper, 2001). Virtual mobility through smartphone and mobile internet developments are altering mobility patterns (Jain & Lyons, 2008; Kwan, 2006; Lyons & Kenyon, 2003) by affording certain practices (Schwanen, Dijst, & Kwan, 2008) and allowing for increased flexibility of activity patterns (Kwan, 2006). However, it has been argued that technology will not be able to replace the need for meeting face to face and social contact in a physical presence (Urry, 2002). It should also be remembered that due to the cost of technology and infrastructure provision, these connections are distributed unevenly spatially and socially (Boulton, 2010; Digital Britain, 2009; Gray, Farrington, & Kagermeier, 2008; Knowles, 2006).

Also contained within this layer of structural change, national wealth and personal income have generally increased over time, influencing mobility mainly through car

use, although this also influences the ability to acquire technology as well as property. Increases in national wealth have influenced infrastructure investment over time. Investment in the road network combined with rising personal incomes also led to increases in car and home ownership, and rising mobility. Residential mobility can be a substitute for residential migration and vice versa; therefore, the (in)ability to move will influence mobility outcomes. There are longer-term impacts on the housing market, for example, there have been increases in inter-generational inequality with regard to home ownership, with the production of a housing market crisis in recent years.

Changing demographic trends, most crucially the development of an ageing population, are having an impact on the mobility profile of age groups. For example, the mobility of older people has been increasing as life expectancies rise as a result of improved health and medical care over this time span. Other demographic effects such as delayed childbirth and changing family structure are also important. The current trends of lower levels of marriage and delays in child-bearing will impact on mobility, as childless individuals tend to have lesser travel needs (Kalter, Harms, & Jorritsma, 2009).

Deep structure effects: bottom layer of cultural changes

Finally, underpinning these layers are “deep structural” processes, which is the bottom layer in [Figure 1](#). These processes develop slowly and relate to experiences and values of mobility by wider society. These also contribute to the development of socially constructed norms regarding mobility, which in turn influence travel patterns.

Firstly, social and family relations have changed over time in relation to mobility. Families have become more dispersed over time; therefore, people may be travelling further to provide care and support to other relatives (Pooley et al., 2005b; Rosenbloom, 2001). As life expectancies have increased and childbirth delayed, there has been an emergence of a “sandwich generation” (Agree, Bissett, & Rendall, 2003; Demey, Berrington, Evandrou, Falkingham, & McGowan, 2011; Evandrou & Glaser, 2004; Pierret, 2006), where people have dependent parents and (grand) children simultaneously. Dependent older people tend to have greater needs than those of children (Agree et al., 2003); therefore, there are greater demands on people of the “sandwich generation” which may produce complex trip-chaining journeys and increased mobility patterns as they carry out personal business on behalf of others, or provide travel assistance as driving cessation occurs amongst older parents (Rosenbloom, 2010).

The second process in this layer is termed the changing meanings of “gender” and “spatialities of life” for birth cohorts. The changing meaning of “gender” relates to the rapid changing roles of women that has been observed during the past 50 years. Women have become increasingly economically independent, as there have been increases in access to higher education and participation in the labour market combined with delays of childbirth. As a result, there have also been socio-cultural shifts as women are remaining single for longer, continuing to network and socialise in their thirties and are also more likely to hold driving licences and own cars to facilitate this (Beuret, Corbett, and Ward, 2014). This combination of factors has produced different activity patterns, resulting in higher mobility.

“Spatialities of life” refers to changing residential locations of different birth cohorts. Older people have tended to migrate to rural and coastal areas in retirement (Atterton,

2006; Bayliss & Sly, 2010; Champion & Shepherd, 2006; Uren & Goldring, 2007). However, there is some evidence of changing attitudes towards retirement locations with an increasing desire amongst people of all ages to move to vibrant urban centres in retirement (McIlwain, 2012; Warren, 2014). Younger cohorts at present are concentrated in dense urban areas (Dennett & Stillwell, 2010) including university cities according to the 2011 census (Office for National Statistics, 2012) and amongst parents of these cohorts, there has been some suggestion that they desire to be closer to their children who may have moved into urban areas for employment (McIlwain, 2012). Also, there has been increasing dispersal of family networks as adult children relocate to seek work after full-time education.

Finally, “cultures of mobility” relates to the expectations that people have about mobility, for example, the ability to visit relatives and have holidays. Findlay, Stockdale, Findlay, and Short (2001) identify that particular “mobility cultures” are associated with people who have chosen to migrate to rural areas from urban areas as they choose to engage in high mobility to continue to access goods and services in urban areas. This produces a “culture” of high mobility; they expect to travel as they want the benefits of living in rural countryside areas, but still desire access to urban areas in order to maintain some aspects of the previous lifestyle they had access to in urban centres.

Government policy may also influence mobility cultures. For example, in 1986 during the deregulation of bus services in the U.K., Margaret Thatcher (Prime Minister at the time) was reported to have said “A man who, beyond the age of 26, finds himself on a bus can count himself as a failure” (HC Deb 2 Jul 2003, vol 408, col 407), which may invoke a particular perception of such individuals, and a desire not to be perceived in this way. During this time, there was an increase in the number of car users, combined with a fall in bus patronage. However, from a London-centric perspective the following policies illustrate how there can be a shift in attitudes and therefore modal shift.

Another example is that of congestion charging, which was introduced in London in 2003, combined with high investment in bus services and an integrated ticketing system, leading to reduced car use with less congestion and increased public transport use in London (Transport for London [TfL], 2008). More recently, the introduction of a public bicycle hire scheme in 2010, which coincided with high-profile cycling achievements such as the Tour de France and London Olympics may have changed perceptions of cycling and encouraged use (Grous, 2012; TfL, 2010). The perceived higher costs of car ownership and increasing public transport fares could also be contributing to bicycle use.

“Cultures of mobility” may also relate to images and identities associated with particular transport modes (Pooley et al., 2005b; Urry, 2007). For example, obtaining a driving licence was considered to be a “rite of passage” as well as owning a car (Weissman, 2012). This may translate into aspiring to own particular cars, travelling by particular transport modes and longer distances that evoke a particular perception, based on mobility, such as a “jet-setter”. These “hyper-mobility” cultures, especially amongst the very wealthy (Elliott & Urry, 2010), invoke a particular image and perception of someone that they may also want to present to others. People may also wish to present an image of being environmentally aware and sustainable, and thus choose to use transport modes that reflect and reproduce this identity.

To understand how the framework can be applied to interpretation of results, the following section considers the increasing mobility of older people, specifically the Boomer cohort, as identified by Tilley and Houston (2016). As current explanations of the mobility of older people are derived from previous generations, the following section focuses on the Boomer cohort as they are likely to have different mobility trajectories in the future.

Cohort trajectories: mobility of the Boomer cohort

This section considers the interactions between period and structural effects and the resulting influence on mobility for the Boomer cohort. In the framework, transmission occurs between the three layers identified in Figure 1 at a point in time. These cyclical effects can lead to inertia on the mobility of birth cohorts and become structural. These may have positive or negative repercussions on the mobility of particular birth cohorts as they age. These are illustrative of cohort effects.

Over the coming decades as the Boomer cohort ages, it is large in terms of its number of members. With improved health and medical care, subsequent cohorts are likely to remain active for longer, thus increasing life expectancies (Christensen, Doblhammer, Rau, & Vaupel, 2009; Tinker, 2002; UN, 2010). A combination of healthier, much older people will lead to a greater proportion of older people in the population, who will also likely be able to continue driving for much longer.

However, particularly in policy, older people are assumed to have lower mobility and require assistance, such as the concessionary travel pass which removes the cost of public transport. The changing mobility trends of the Boomers could be interpreted more widely to consider other factors, rather than just increasing driving licencing and underpinning this with wider considerations. Table 1 presents a summary of the different multi-level forces affecting the mobility of the Boomer cohort (b. 1945–1964).

Table 1. Different multi-level forces affecting the mobility of the boomer cohort.

Period effects	<p>Fluctuating fuel prices leading to changing car use and uptake of the concessionary travel pass.</p> <p>Labour market impacts – early retirement/increasing retirement age.</p> <p>Housing market cycle – older people did engage in residential moves during the recent economic recession Cooke (2011), suggesting that residential migration is being substituted for increased mobility.</p>
Structural effects	<p>Development of the private car and road system and car design adapted to the life-course of the Boomer cohort, for example, the development of estate cars when they were having children (Coughlin, 2009).</p> <p>Suburban residential development, processes of retreat from inner city urban area.</p> <p>Assistive tools for driving, e.g. satellite navigation devices and in-car vehicle technology. Potential for “driverless” cars.</p> <p>Access to free higher education, experienced long periods of economic growth enabling the acquisition of wealth and property over time (Hamilton & Hamilton, 2006; Spain, 1997).</p> <p>Short-distance residential mobility has been on a long-term downward trend since the 1970s in Britain (Champion & Shuttleworth, 2015). Potentially related to rising homeownership.</p> <p>Increases in life expectancy, leading to an ageing population, with older people being healthier and more active.</p>
Deep structure effects	<p>Dispersal of family networks and emergence of the “Sandwich generation” (dual caring of older parents and younger (grand)children (Demey et al., 2011).</p> <p>Changing residential locations, potential preference towards urban centres in retirement</p> <p>Higher expectations about mobility having obtained a driving licence as a “rite of passage”</p> <p>First to experience package holidays and emergence of low budget airlines.</p> <p>Thatcherite Govt ‘failure if on a bus at 26’ reinforcing car use.</p>

“Period effects” influencing Boomer cohorts

Taking the top layer of the framework, [Table 1](#) illustrates how the Boomers are affected by changing oil prices, which impact the affordability of driving compared to public transport. Around the world, many older people are eligible for some form of concessionary travel policy, allowing for cheaper public transport travel. With regard to the labour market, some may have taken early retirement or may have to delay retirement and continue to work. Both may contribute to higher mobility, as activities increase after retirement (Van Den Berg, Arentze, & Timmermans, 2011), and a continuation of commuting. Cooke (2011) observed that older people did not engage in residential moves during the most recent economic recession, resulting in higher mobility. In the following years as house prices fell, residential mobility also declined, resulting in higher travel mobility as older people do not wish to lose equity gained on their property.

“Structural effects” influencing Boomer cohorts

In the second layer of the framework, during processes of suburbanisation and counter-urbanisation, residential homes were encouraged to be located away from urban centres (Pooley et al., 2005b; Power, 2012). The Boomer cohort was also brought up alongside the development of the private car and road system, with car design adapted to the life-course of the Boomer cohort, for example the development of estate cars when they were having children (Coughlin, 2009). Other technological developments in assistive tools relating to driving, such as satellite navigation devices and in-car vehicle technology, may enable older people to drive for longer (Emmerson, 2012; Guo, Brake, Edwards, Blythe, & Fairchild, 2010). The recent development of “driverless” cars by Google (Thrun, 2010) suggests evidence of catering for the Boomer cohort and an ageing population.

The Boomer cohorts have also benefited from free education and experienced long periods of economic growth, enabling them to acquire wealth and home ownership over time as well as being involved in various social and civil rights movements (Hamilton & Hamilton, 2006; Spain, 1997). More recently, studies have demonstrated that short-distance residential mobility has been on a long-term downward trend since the 1970s in Britain (Champion & Shuttleworth, 2015). This could be related to rising homeownership and the transaction costs associated with buying and selling homes, that is, a structural effect as well as period effect links to the boom–bust cycle in the housing market. Finally, older people now have increased life expectancies as a result of being healthier and more active than previous generations (United Nations [UN], 2010).

“Deep structure effects” influencing Boomer cohorts

Taking the first aspect of the bottom layer of the framework, affecting the mobility of Boomer cohorts is the emergence of the “sandwich generation” (Agree et al., 2003; Demey et al., 2011; Evandrou & Glaser, 2004; Pierret, 2006), whereby people undertake dual caring roles, most notably women. Compounding this is the dispersal of family members and changing the nature of mobility. With increasing life expectancies, current grandparents are living longer and are more active compared to former cohorts

of older people and have adopted caring roles for younger grandchildren, differing from former cohorts. Pooley et al. (2005a) indicate that grandparents are more likely to visit grandchildren and assist with childcare duties, whereas amongst former cohorts grandchildren would visit grandparents. Cooke (2011) has also found evidence of grandparents visiting grandchildren over longer distances, substituting residential travel for migration.

The second aspect of the bottom layer indicates that the women of the Boomer cohort have very different characteristics to former birth cohorts, with more women gaining higher education and being in employment. Amongst current generations of older people, there is also some suggestion of changing residential location preferences, as they desire to be closer to their children who may have moved into urban areas for employment (McIlwain, 2012). Finally, various policies may be contributing to mobility outcomes, such as the quote from the Thatcher government, and the Boomers would have been around that age when the quote was made. Also obtaining a driving licence was considered a “rite of passage”.

As a result of this combination of factors, the Boomer cohort is predicted to have higher expectations about mobility, and different characteristics in relation to mobility. This is likely to lead to increased mobility in their later years, compared to former cohorts of older people. This account briefly and broadly illustrates a combination of effects that have influenced mobility patterns amongst this cohort. These have contributed to changes in the mobility of older people at the aggregate level. This will challenge assumptions of older people as having lower mobility.

Similar principles can be applied to the investigation of the mobility of other cohorts.

The accumulation of resources through the life-course will influence mobility outcomes in the future (Bailey, 2009; Rosenbloom & Herbel, 2009). For example, in the case of the Boomer cohort, having learnt to drive earlier in life and as a result of higher wealth they look set to be highly mobile in later life. The acquisition of resources is influenced by structural forces and will therefore differ for each successive cohort as they will experience different effects of these forces at the same point in time, but will be at different stages of the life-course.

Future implications for mobility and conclusions

Dominant frameworks to explain mobility change tend to focus on singular explanations, rather than a consideration of a wide combination of interlinked factors. Population projections and characteristics are useful for understanding how and why cohort groups travel and the changes that occur over time. As cohorts age, their characteristics, needs, desires and expectations will evolve over time. As such, when they reach a particular age, their mobility patterns are likely to differ from earlier cohorts and the assumptions about particular age groups may no longer hold.

The framework put forward in this paper adopts a multi-level approach that can assist in identifying the contexts that birth cohorts experience at particular points in time, and therefore assist in the interpretation of changing mobility trends. Not only can the framework help identify what is occurring at a current time point, it can also determine what has happened in the past to contribute to particular mobility outcomes.

Recently, there has been growing interest in the travel behaviour of the millennial generation (also known as Generation Y, generally considered to be born from around the

1980s onwards) in comparison to those of the preceding generations. In relation to the “peak car” debate, many have observed the notable reduction of younger people, particularly younger men, obtaining a driving licence across different countries (Delbosc & Currie, 2013; Kuhnimhof, Armoogum, et al., 2012). Exploring this issue in relation to time use, Garikapati, Pendyala, Morris, Mokhtarian, and McDonald (2016) find that there are differences between younger and older millennials, with younger ones spending significantly more time in the home. By contrast, older millennials have similar activity-time use patterns to their prior generation counterparts as they age, with the exception of time spent as a car driver. Studies have also found that millennials tend to have lower rates of car ownership, make fewer trips as well as travel fewer miles (McDonald, 2015; Polzin, Chu, & Godfrey, 2014). Tilley and Houston (2016) find that the mobility of younger men has fallen so that it is lower than that of women of the same age and generation.

Although there has been a decline in car use and mobility amongst younger people, which has also been associated with the “peak car” phenomenon, there are questions to whether current generations of younger people will continue to forego car use or whether they are simply delaying traditional life stages of previous generations (e.g. marriage, childbirth, etc.) and will eventually acquire a car-dependent lifestyle (Brown, Blumenberg, Taylor, Ralph, & Turley Voulgaris, 2016; Delbosc, 2016).

Some studies suggest that millennials are delaying the inevitable life stages (Garikapati et al., 2016) due to lag economic effects and higher levels of car ownership amongst the oldest of the millennial cohort (Klein & Smart, 2017). Increases have also been observed in car trips rendering calls for “planners to temper their enthusiasm about ‘peak car’” (Newbold & Scott, 2017), suggesting that millennials will eventually adopt the car as part of their everyday mobility as seen with previous generations. The framework put forward in this paper then can add to this debate and predications about the future mobility of the millennial cohort/Generation Y by drawing on a wider combination of factors.

The most recent recession, whilst having had varying impacts on the whole population, has almost certainly had greater adverse effects on current cohorts of younger people. Youth unemployment has increased dramatically, not only in Britain but in other EU countries as younger people leaving education have been unable to gain entry to the labour market. The lasting impact of unemployment has raised concerns about these cohorts being a “lost generation” (Eurofound, 2012); perhaps similar to the “silent generation” who grew up during the Great Depression (Strauss & Howe, 1991 in Lehto, Jang, Achana, & O’leary, 2008).

Therefore, there may be potentially damaging ramifications on the mobility of these current younger cohorts when they are older as a result of being unable to drive. In a car-centric society, being unable to drive also affects the ability to access employment opportunities. These cohorts may be more reliant on public transport services, but due to reductions in bus subsidies there has been a contraction in services in some areas, further reducing mobility options for this cohort (in addition to current older people who may be reliant on these services). The lack of adequate resources for mobility may lead to issues of social exclusion (Lucas, 2012).

However, other structural forces may lead to younger cohorts compensating for or offsetting lower mobility. During the lifetime of younger cohorts, there have been rapid developments in electronic and telecommunications technology (Foot & Stoffman, 2000; McIntosh-Elkins, Mcritchie, & Scoones, 2007). These younger cohorts differ from

current and former cohorts and have been termed “digital natives” (Lyons, 2015; Van Wee, 2015) as they have grown up alongside these developments and are familiar with ICT applications and the internet, much like the Boomer cohort grew up with developments in the car (Coughlin, 2009). There is some evidence to suggest that younger cohorts value technology, particularly the smartphone and good internet access, as opposed to car ownership (Weissman, 2012).

The use of such technology amongst younger cohorts may be an alternative to travel, or desire to use it whilst travelling as it produces more “valued” travelling time (Jain & Lyons, 2008; Lyons, Jain, & Holley, 2007; Lyons & Urry, 2005). Smartphones in particular have been argued to provide freedom in terms of accessing information, family, friends and other contacts via social media (Lyons, 2015; McDonald, 2015). The development of smartphone apps and availability of real-time travel information including via Twitter can encourage change to behaviour and provide different opportunities for travel. Smartphones also provide different opportunities for travel including ridesharing services such as Uber and Lyft, which are more commonly used amongst younger people (McDonald, 2015).

As this technology has become more important amongst younger people, it may override the desire for higher mobility sought by former cohorts, thus producing a different culture of mobility and changing the meaning of mobility and space for these cohorts. Mobility decisions may be integrated more fully into residential migration decisions, particularly if these cohorts are unable to drive. Evidence of this may already be occurring, reflected in the changing desires for retirement locations towards city living where public transport services tend to be of a higher quality (McIlwain, 2012).

Demey et al. (2011) note that amongst younger people aged around 20–44, there has been a decrease in the proportion of those living with a partner and having dependent children, yet an increase in the proportion of those living with a partner and without children. Therefore, the suggestion that millennials are delaying life stages should be treated with caution. In addition, there may be larger shifts in technology, demography and socio-cultural characteristics of the millennials, which will not lead to the same levels of mobility seen amongst previous generations. Indeed, Delbosc (2016) argues that policy may be able to continue the lower use of cars by the current younger generation and prevent mobility based on the car.

The model adapted from Fielding (1993, 2010) demonstrates how effects are not cyclical and how they may become structural for the millennial cohort, particularly in the “peak car” debate. This framework then highlights gaps and ideas for not only the interpretation of results, but where further analysis is required. In relation to the “peak car” debate, there is a need to identify the issues for younger people more widely to consider attitudes for example, although this alone may not be sufficient and may need to be combined with other influences.

Whilst a full consideration of the combination of wider demographic and social changes that may be having great influence on mobility trends has been attempted to be captured within the framework, it may not be suitable for all contexts. The empirical analysis upon which this framework has been drawn was based on a British context, although it could be transferred to studies largely in the Global North. It also tends to operate and generalise at a national level and it should be recognised that there will be regional variations within this. However, the framework itself is designed to be fluid and therefore could be adapted to suit different situations.

Changing attitudes and lifestyles may be captured through surveys alongside travel behaviour; however, understanding about where attitudes and lifestyles have changed will come about through an exploration of the combination of factors to understand the cumulative effect. Each generation has had to cope with new forms of transport technology and negotiate the impact of new mobilities on society (Pooley et al., 2006). Mobility cultures are learnt from being part of a particular cohort that has implications for mobility now and in the future. By understanding past and current influences on cohort groups, better predictions about future and therefore needs over longer time horizons can be made and planned for accordingly.

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